

DISCUSSION DRAFT

LONG RANGE METRO DELIVERY TONNAGE FORECAST

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Finance and Regulatory Services

Prepared for
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Operations RFP 09-1418-SWR

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Purpose

The purpose of this paper is to provide a discussion DRAFT (*i.e.*, a starting point) long-range Metro tonnage forecast for use in the procurement of Metro transfer station operators, RFP 09-1418-SWR. As such, the forecast will be for all major waste streams delivered to Metro Central and Metro South (wet, dry, wood and organics), and will be made with a monthly periodicity for the next seven calendar years.

Methodology

The forecast is produced according to the following:

1. A long-horizon demographic model will be used to make annual forecasts of wet and dry (“core”) delivery tonnage at Metro transfer stations. These annual forecasts will then be seasonalized to yield monthly values.
2. For wood and organics deliveries to Metro transfer stations, forecasts used to produce the current Fiscal Year 2009/2010 budget tonnage assumptions will be used wholesale and extrapolated through the forecast horizon where appropriate.

Demographic Model

The demographic model is based on one exogenous variable – population – and multiple parameters that convert population into waste quantities, some of which vary with the business cycle. When combined with the seasonal factors, the core delivery tonnage forecasts therefore contain trend, cyclic and seasonal components.

The model parameters are each projected independently using various assumptions. The suite of assumptions underlying each parameter projection forms the expected forecast scenario presented in Table 1 below. A schematic and narrative description of the model is provided in Figure 1. Seasonal factors are presented in Table 2.

Table 1 – Model Parameters, Assumptions and Data Sources

Parameter	Expected Scenario	Data Source/Derivation & Rationale
Tri-County ¹ Population	Compound growth at 1.54% annually from 1,593,370 in base year 2007.	1,593,370 is the 2007 certified mid-year Tri-county population estimate from PSU Center for Population Research; The expected (1.54%) growth rate is the DRC’s long-run, mid population growth rate ² .
Generation Rate per capita	From 3,400 annual lbs per capita in 2007, decreasing to 3,050 by 2010, followed by growth of 35 lbs/capita/year	Short term growth declines reflect the response of per capita generation to the business cycle. Per capita generation during the 2000/2001 Oregon recession hovered around 3,000 lbs/capita for 3 years. The year 2010 is assumed to be the bottom of the current recessionary cycle. Growth from 2010 onward (35

¹ The Metro wasteshed is comprised of Clackamas, Multnomah and Washington counties.

² Metro, *20 and 50 year Regional Population and Employment Range Forecasts*, March 2009 (draft)

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	thereafter.	lbs/capita) is one half the long-term historical growth rate during 1992 – 2007. ³
Regional Recovery Rate	The state target of 58% ⁴ is met, but only by 2013; growth up to target is assumed linear.	Delay in meeting the target is based on the delay in implementing key new programs, ⁵ some of which are not anticipated to have a significant effect on regional recovery for a few years.
Post Collection Recovery	Assume constant 3.3 points of the regional recovery rate is post collection recovery.	Historical (base year percentage).
Dry delivery tonnage	Constant rate of 41.4% of total delivery tonnage ⁶	Historical (base year percentage).
Wet delivery tonnage	Constant rate of 54.8% of total delivery tonnage	Historical (base year percentage).
Metro Central Wet Waste Market Share	Constant rate of 29 percent of total wet delivery tonnage	Historical (base year percentage).
Metro Central Wet Waste Diversion	No diversions	No diversions are assumed.
Metro South Wet Waste Market Share	Constant rate of 20.7 percent of total wet delivery tonnage	Historical (base year percentage).
Metro South Wet Waste Diversion	No diversions	No diversions are assumed.
Metro Central Dry Waste	Constant rate of 15.3 percent of total dry	Historical (base year percentage).

³ Historical growth in the per-capita generation rate has been inflated by a variety of factors such as improved measurement methods over time. DEQ estimates that 20 to 50 percent of the apparent increase is due to such factors. [DEQ, *Solid Waste Generation in Oregon: Composition and Causes of Change*, February 2007].

⁴ The statutory target is 64%, which includes up to 6 percentage points for waste prevention, reuse, and home composting. The 58% used for this study represents recovery through source-separation programs (including the bottle bill) and post-collection recovery. The state target is set forth in ORS 459A.010(6)(a).

⁵ Metro designed three new initiatives to help meet the 58% recovery target. The initiatives address source-separation of compostable organic waste, expanded recycling for businesses, and post-collection recovery of materials from dry waste. Some of these programs rolled out late in January 2008, and EDWRP rolled out in January 2009.

⁶ “Delivery tonnage” is defined as the amount of mixed solid waste that is accepted by disposal sites and solid waste facilities from haulers, businesses and the public. It excludes transfers of processed waste from facilities to landfills. In this model, “regional core delivery tonnage” is numerically equivalent to the tonnage of post-collection recovery and disposal, with error allowances owing to the fact that DEQ historical disposal data may in fact include other types of waste incorrectly reported by disposal facilities.

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Market Share	delivery tonnage	
Metro Central Dry Waste Diversion	Diversions of 3,350 tons beginning in 2008.	New material recovery facilities (MRFs), including Greenway Recycling and Pacific Land Clearing 3 entered the system and accepted 67,000 tons of dry delivery tonnage in 2008. It is assumed that about 5 percent of this gain was a Central loss and will continue through the forecast horizon.
Metro South Dry Waste Market Share	Constant rate of 19.8 percent of total dry delivery tonnage	Historical (base year percentage).
Metro South Dry Waste Diversion	Diversions of 1,675 tons beginning in 2008.	Similar to Central, it is assumed that about 2.5 percent of Greenway and PLC3's 2008 tonnage was a South loss, this continuing through the forecast horizon.

Table 2 – Wet and Dry Delivery Tonnage Seasonal Factors⁷

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Wet	.084	.074	.082	.082	.087	.084	.084	.087	.082	.085	.084	.084
Dry	.073	.071	.081	.081	.088	.092	.097	.099	.089	.088	.073	.068

FY09/10 Budget Extrapolation

Time series models⁸ were used to project wood and organics tonnage through the next fiscal year and beyond, in order to set the tonnage assumptions for the FY 2009-2010 budget. These forecasts are used wholesale in this analysis.

Results

The detailed results of the Metro Central and Metro South delivery tonnage forecasts are presented in a separate spreadsheet in the Appendix. An annual summary is presented below.

Forecast Summary

The expected forecast projects 2009 wet waste deliveries of 206,000 and 148,000 to Metro Central and South, respectively. Deliveries then fall in 2010, and remain fairly flat through 2013, coincident with declining per capita waste generation and increasing regional recovery on the downside, and moderating population growth on the upside. It isn't until 2014, when the increasing recovery rate stabilizes, that significant wet waste growth returns to Metro transfer stations.

The dry waste delivery tonnage forecast looks similar, but the declines through 2013 are more pronounced, given the assumption that Greenway Recycling and Pacific Land Clearing continue to divert some drop box loads from both transfer stations. As with wet waste, growth in dry waste is projected to return in 2013.

⁷ These factors are highly stable and are the same ones used in the forecast sharing model to disaggregate delivery tonnage forecasts into revenue-relevant tonnage forecasts for the budget.

⁸ Box-Jenkins models were specified and estimated using the X-12 ARIMA software package developed by the US Census Bureau.

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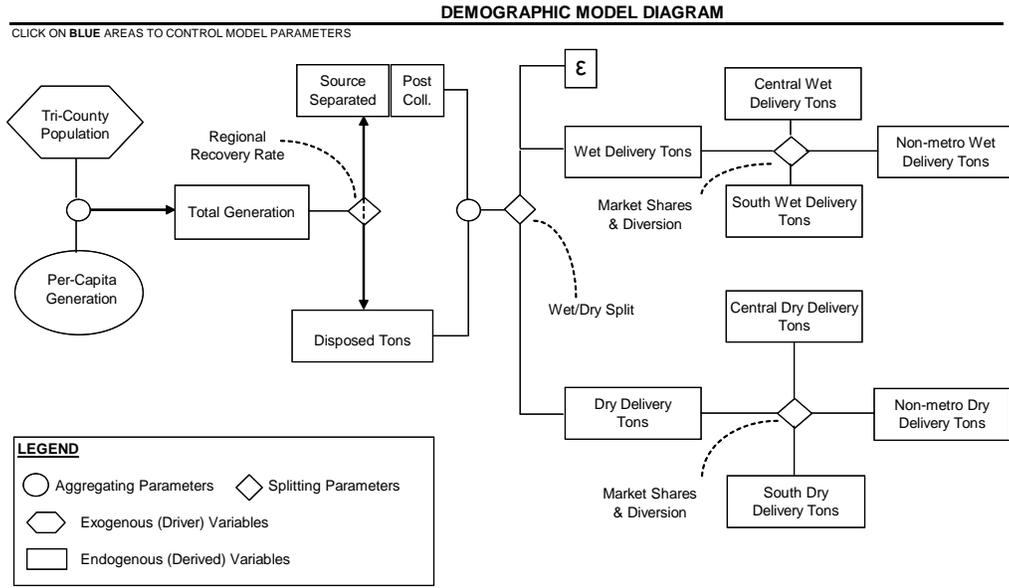
As previously mentioned, forecasts of wood and yard debris loads were obtained using mathematical time series models, and reflect general historical trends in each waste stream over time. Wood deliveries are projected to increase at moderate rates over the forecast horizon, while organics deliveries are projected to fall initially, but then remain fairly flat for several years before growing again in 2014. Table 3 presents these results for each transfer station.

Table 3 – Forecast Results

	<u>2009</u>	<u>2010</u>	<u>2011</u>	<u>2012</u>	<u>2013</u>	<u>2014</u>	<u>2015</u>
Metro Central							
Wet	205,690	200,445	199,790	198,930	197,857	203,104	208,465
Dry	75,201	76,817	76,555	76,211	75,782	77,881	80,025
Total	280,890	277,262	276,346	275,142	273,639	280,984	288,489
Wood	7,917	8,241	8,682	9,146	9,636	10,381	10,992
Organics	16,523	15,568	15,622	15,636	15,726	16,624	17,104
Metro South							
Wet	147,881	143,033	142,567	141,953	141,187	144,931	148,756
Dry	102,102	101,881	101,543	101,099	100,544	103,255	106,025
Total	249,983	244,915	244,110	243,052	241,731	248,186	254,781
Wood	3,867	3,968	4,180	4,404	4,639	4,998	5,292
Organics	0	0	0	0	0	0	0

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Figure 1 – Demographic Model Schematic and Narrative



NARRATIVE

Regional population multiplied by per capita generation (in tons per person per year) yields total generation for the region, some of which is recovered while the remainder is disposed. Regional recovery includes source-separated recyclables, as well as materials that are removed from mixed waste at facilities ("post collection recovery"). The sum of post collection tons and disposal tons is numerically equivalent to the tonnage of mixed waste delivered to all solid waste facilities - a concept Metro terms "core delivery tons". Some of these delivery tons are putrescible, while others are non-putrescible, and include construction and demolition wastes. Metro facilities' share of these two delivery tonnage streams is a function of each facilities' historical base share, plus potential future diversion scenarios such as new waste facility entrants to the solid waste system.

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